MASTER

XXXVI

Rainfall during 'Daylight Hours'

1. Introduction

From those stations in England and Wales which return monthly rainfall totals for the half daily periods - 0900 - 2100 hours, and 2100 - 0900 hours, 20 were selected which give records for the 15 year period 1945 - 1959. They were also chosen to provide as wide a geographical coverage as possible.

Monthly percentages of the rainfall in 'daylight' hours (i.e. 0900 - 2100 hours) to the total (0900 - 0900 hours) fall were calculated. From these dispersion diagrams were drawn up for each station and the median values over the 15 year period found. These are listed in Table 1.

The number of wet 'days' in each month were tabulated against monthly rainfall. These were then grouped into seasons and connecting formulae derived. A wet 'day' recorded 1 mm or more during the 0900 - 2100 period.

2. Results

Smoothed Curves drawn through the median points of the dispersion diagrams show that the annual variation of 'daytime rain' falls into four distinct patterns. The stations, therefore, may be grouped into these having:-

I	A single minimum in winter	Abingdon Acklington Boscombe Down Dunstable South Farnborough
II	A minimum in autumn with a secondary minimum during spring	Exeter Shoeburyness
III	A single minimum in summer	Portland Bill Plymouth Valley
IV	Double minima in late winter or spring and in autumn	Aberporth Cranwell Driffield Edgbaston Gorleston Little Rissington Mildenhall Ringway Shawbury West Malling

Typical examples of each group are given in Figure 2.

These groups in turn fall into distinct areas within England and Wales (see Figure 3). Stations in Groups I and II all lie within Southern England except for an outlier in the North-East. Those in Group III are coastal sites in the West and South and it is interesting to note that at these stations the proportion of 'daylight' to total rainfall does not, at any time during the year, rise above 50 per cent. Group IV, containing half the stations considered, covers the remainder of England and Wales, including a section of the South-East.

/Wet 'Days'

3. Wet Days

A wet 'day' is here defined as one in which 1 mm of rain or more falls during the daylight hours 0900 – 2100. Formulae connecting the number of wet 'days' in a month and monthly rainfall totals show that, within the four categories given, the number of 'days' spoilt by rain in England and Wales follows a seasonal pattern as indicated by the following regression equations:-

Group I	Spring	$W = 0.35\,R - 0.75$	W. = wet "days" per month.
	Summer	$0.37\,R - 1.69$	
	Autumn	$0.25\,R - 0.41$	
	Winter	$0.31\,R - 0.58$	
Group II	Spring	$W = 0.45\,R - 3.08$	R. = monthly rainfall (in inches) within each season.
	Summer	$0.45\,R - 3.79$	
	Autumn	$0.19\,R + 0.60$	
	Winter	$0.33\,R + 1.28$	
Group III	Spring	$W = 0.30\,R - 0.54$	
	Summer	$0.31\,R - 2.21$	
	Autumn	$0.30\,R - 1.87$	
	Winter	$0.33\,R - 1.65$	
Group IV	Spring	$W = 0.29\,R + 0.32$	
	Summer	$0.33\,R - 1.29$	
	Autumn	$0.25\,R - 0.06$	
	Winter	$0.29\,R - 0.02$	

4. Conclusions

Although the smoothed curves through the median points do follow certain patterns of behaviour, the scatter about the average is great and too much reliance should not be placed on these results in regard to the weather of any one year.

Perhaps the most important climatic conclusion that can be drawn concerns Group III. There is a clear tendency for coastal stations in the South and West to have less daytime rain in summer than might be expected from their rainfall totals.

The equations in Paragraph 3 could be used to give a fair estimate of rain 'days' in the absence of any direct observation.

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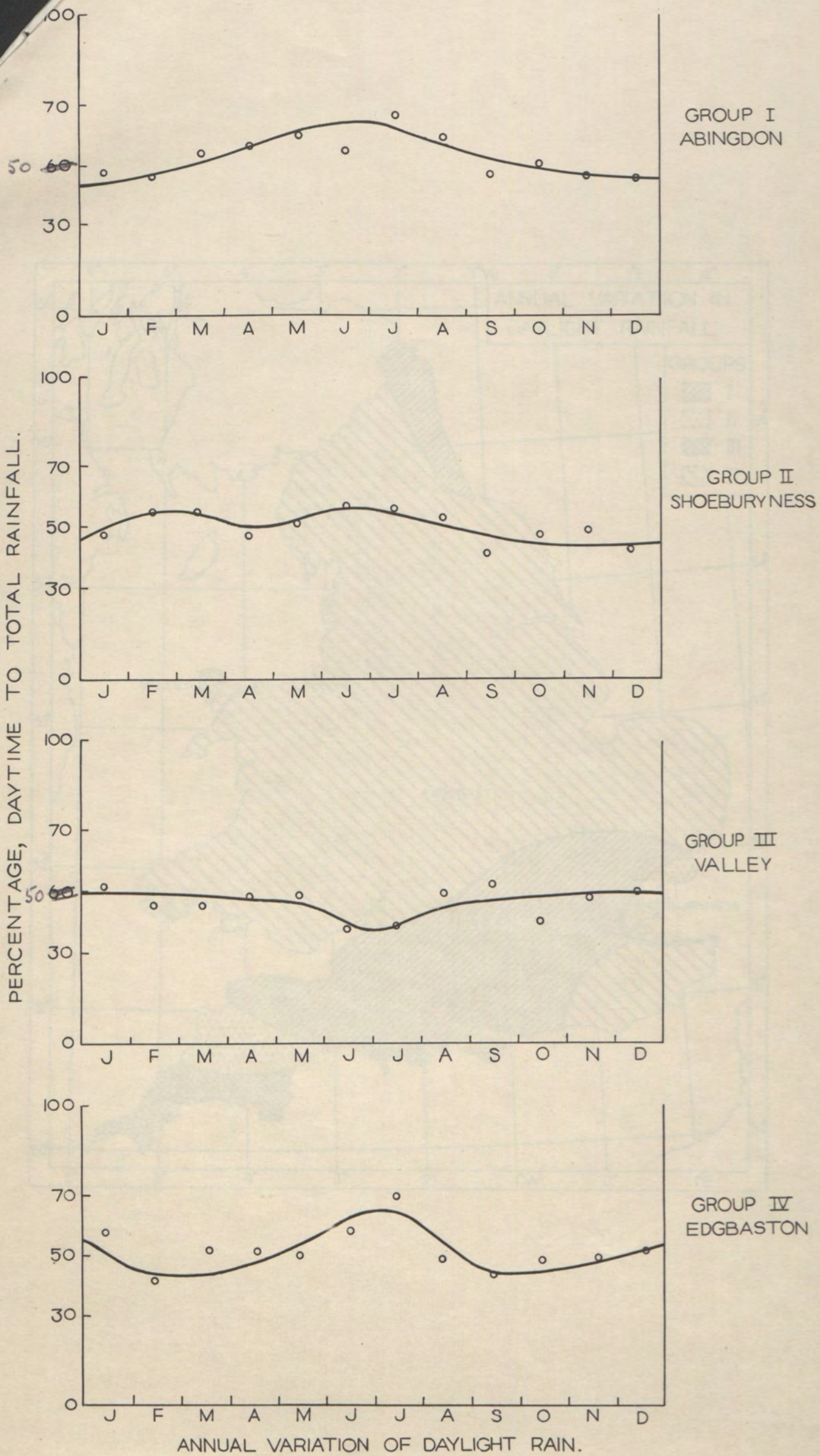
Table I

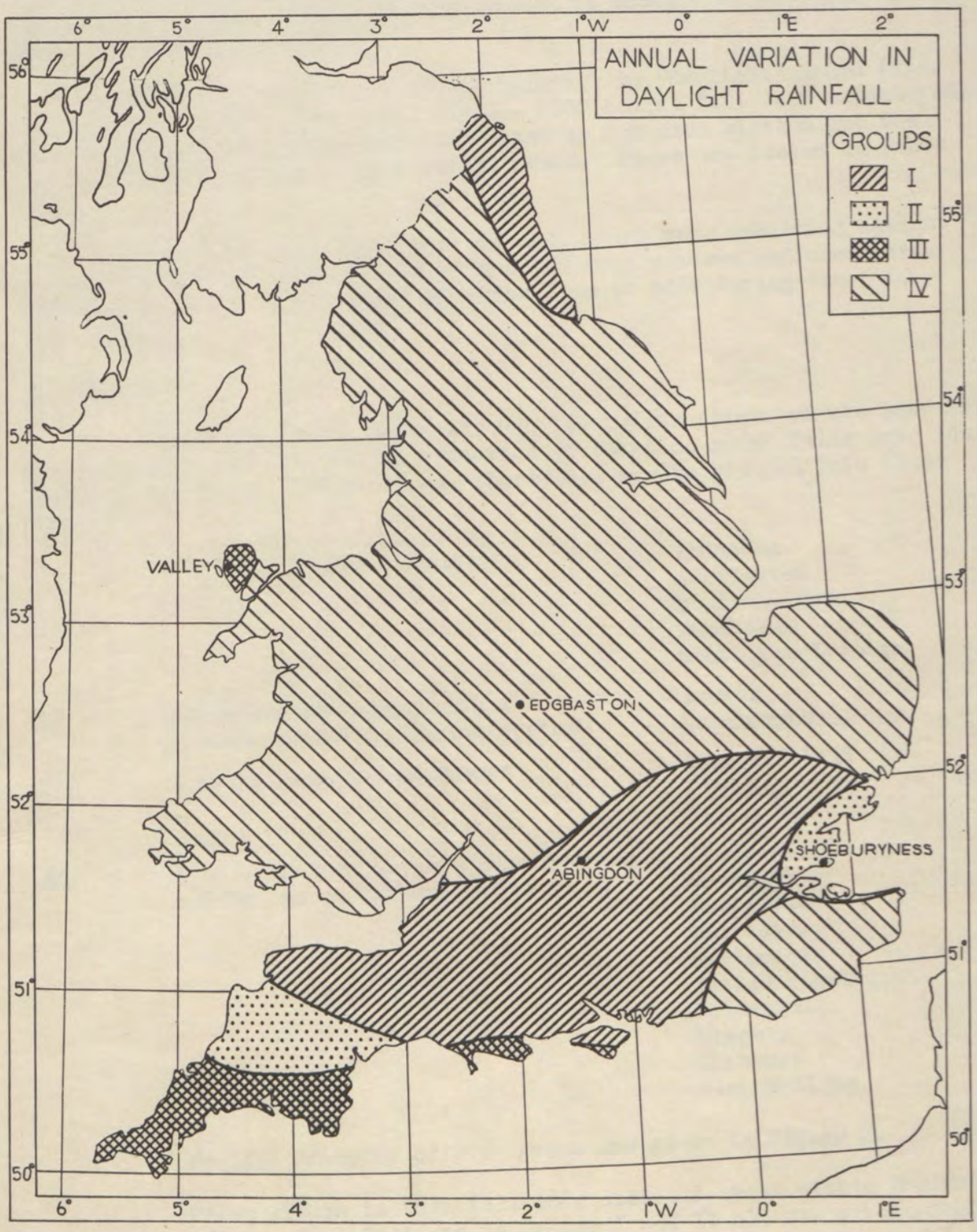
Median Percentages of 'Daylight' to Total Rainfall

1945 - 1959

	Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
Group I	Abingdon	48	46	55	56	59	56	69	60	47	50	47	45
	Acklington	56	51	60	55	53	59	49	48	52	50	41	52
	Boscombe Down	51	55	48	58	51	64	54	50	49	50	51	48
	Dunstable	56	50	53	58	55	57	50	52	41	57	46	47
	South Farnborough	47	48	53	58	50	51	56	54	46	56	48	46
Group II	Exeter	45	53	53	58	48	58	55	60	43	46	53	49
	Shoeburyness	49	56	57	49	52	58	58	53	42	48	51	44
Group III	Portland Bill	53	46	51	49	47	38	41	32	46	47	51	46
	Valley	52	46	46	49	49	37	39	50	52	41	49	51
	Plymouth	48	45	50	45	53	47	49	54	42	51	44	48
Group IV	Aberporth	52	39	46	46	45	45	47	50	53	42	45	47
	Cranwell (1931-1945)	47	44	52	37	37	51	54	52	49	50	46	46
	Driffield	60	44	52	47	50	45	63	64	49	56	45	51
	Edgbaston	59	42	52	52	51	57	70	49	44	49	50	52
	Gorleston	43	50	41	47	43	61	58	53	46	51	47	45
	Little Rissington	52	43	50	58	58	61	65	63	51	45	45	52
	Mildenhall	50	55	45	49	51	60	61	45	43	66	50	52
	Ringway	52	48	50	49	61	56	55	58	51	46	50	55
	Shawbury	56	43	44	54	56	56	54	53	45	47	45	56
	West Malling	55	54	46	43	52	59	57	59	48	52	45	49



ANNUAL VARIATION OF DAYLIGHT RAIN.


ANNUAL VARIATION IN DAYLIGHT RAINFALL
GROUPS
I
II
III
IV
6°
5°
4°
3°
2°
1°W
0°
1°E
2°
56°
55°
54°
53°
52°
51°
50°
VALLEY
EDGBASTON
ABINGDON
SHOEBURYNESS